

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/GB2004/002963

International filing date (day/month/year)  
09.07.2004

Priority date (day/month/year)  
09.07.2003

International Patent Classification (IPC) or both national classification and IPC  
G01L1/20, G01L5/22, A61B5/103

Applicant  
ASTON UNIVERSITY

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

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10/563675

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/GB2004/002963

IAP20 Rec'd PCT/PTO 06 JAN 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/002963

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**Box No. II Priority**

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1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	6,7,12
	No: Claims	1-5,8-11,13-18
Inventive step (IS)	Yes: Claims	
	No: Claims	1-18
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted:

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)

PCT/GB2004/002963

## Re Item V.

- 1 The following documents are referred to in this communication:
- D1: US 2003/079549 A1 (ALEXANDER SATHYA R ET AL) 1 May 2003 (2003-05-01)
  - D2: US-A-5 445 020 (ROSENSWEIG RONALD ELLIS) 29 August 1995 (1995-08-29)
  - D3: WO 00/73982 A (TACTEX CONTROLS INC ; INKSTER D ROBERT (CA)) 7 December 2000 (2000-12-07)

## INDEPENDENT CLAIM 1

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** is not new in the sense of **Article 33(2) PCT** in view of **D1**.

2.1 Document D1 discloses (the references in parenthesis applying to this document) a sensing system (Par. 2) comprising:  
a deformable load bearing surface (membrane 14 in Fig. 1),  
a plurality of mutually spaced sensors (pressure sensors 20 in Fig. 1),  
said sensors being coupled through the deformation response of the surface to an applied load whereby to receive local sensory data from said surface (Par. 6),  
a processor operatively coupled to said sensors and arranged to receive said sensory data from the sensors (Par. 46, 1st sentence)  
and to transform said sensory data into information data relating to a load applied to the surface (Par. 46, 2nd and 3rd sentence),  
and an output for outputting the information data (Par. 46, 2nd sentence),  
wherein the processor is arranged to process the sensory data received by all the sensors collectively (Par. 53).

## INDEPENDENT CLAIM 14

3. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 14** is not new in the sense of **Article 33(2) PCT** in view of **D1**.

3.1 Document D1 discloses a sensing device which comprises all the apparatus features of a golf swing analyser, because it allows for the location and force of a point

pressure applied e.g. from the foot of a player to the pressure sensing surface of the system (see as well Par. 2).

#### INDEPENDENT CLAIM 15

4. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 15** is not new in the sense of **Article 33(2) PCT** in view of **D1**.

4.1 Document D1 discloses (the references in parenthesis applying to this document) a method of characterising a load applied to a load bearing surface (Par. 2) comprising the steps of:

- (i) generating sensory data (from sensors 20, see e.g. Fig. 1) about the surface (see membrane 14 in Fig. 1 and argumentation given in Par. 33) from a plurality of sensing elements (20) operably coupled with the surface,
- (ii) combining the sensory data into a single vector of inputs for a transformation (set of pressures  $v_i$  and sensor locations  $x_i$ , see Par. 53),
- (iii) applying a transformation to the vector of inputs (see e.g. transformation disclosed in Par. 52-74) whereby to generate information data characterising the load (Par. 64 or Par. 73), and
- (iv) outputting the information data (Par. 46).

#### INDEPENDENT CLAIM 17

5. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 17** is not new in the sense of **Article 33(2) PCT** in view of **D1**.

5.1 Document D1 discloses (the references in parenthesis applying to this document) a carrier medium carrying a computer executable software program for controlling a computer to carry out the steps (Par. 106):

- (ii) combining the sensory data into a single vector of inputs for a transformation (set of pressures  $v_i$  and sensor locations  $x_i$ , see Par. 53),
- (iii) applying a transformation to the vector of inputs (see e.g. transformation disclosed in Par. 52-74) whereby to generate information data characterising the load (Par. 64 or Par. 73).

DEPENDENT CLAIMS 2-13, 16, 18

6. **Dependent claims 2-13, 16, 18** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

6.1 The feature of **claims 2, 8 and 16** is known from **D1**, because the functions  $H(x_i)$  (see Par. 57) and  $V_w^{-1}(v_i)$  (see Par. 73) are non-linear, e.g. polynoms (see as well Par. 65). (**A 33(2) PCT**)

6.2 The features of **claims 3 and 4** are known from **D1**, see Par. 9. (**A 33(2) PCT**)

6.3 The features of **claim 5 and 13** are known from **D1**, see e.g. Fig 1, planar membrane (14) in contact with the transducer (20). (**A 33(2) PCT**)

6.4 The features of **claims 6 and 7** are **obvious** for a person skilled in the art to either display the outputs, as provided in **D1**, Par. 46, or to provide a logging of the respective data. A standard data logging and displaying system is disclosed e.g. in **D3**, col. 6, l. 63 - col. 7, l. 19. (**A 33(3) PCT**)

6.5 The feature of **claim 9** is known from **D1**, see Par. 28. (**A 33(2) PCT**)

6.6 The feature of **claim 10** is known from **D1**, see e.g. Fig. 7, wherein the deformable load bearing surface (14) forms part of a housing (defined by parts 12 and 14), the sensors (48) being sealed therein. (**A 33(2) PCT**)

6.7 The feature of **claim 11** is known from **D1**, which is disclosing a housing (see Fig. 7, parts 14 and 12) containing a flowable material (e.g. air confined in the optical cavities 42)

which flows under the surface as part of the mechanism of the deformation response of the surface (the air is flowing due to temporal pressure differences created between the region close to the locally deformed surface and more distant regions of the optical cavity 42),

and the sensors are arranged to detect pressure differentials due to the flow of material (by means of pressure detectors 48 in Fig. 7). (**A 33(2) PCT**)

6.8 The feature of **claim 12** is **obvious** from **D1** when providing the pressure sensitive

medium (44) in Fig. 7 as an **open cell foam** filled with air, as disclosed in **D3**, p. 9, l. 11-12. The open cell foam is a flow restrictor which affects the flow characteristics of the air upon deformation of the surface. (**A 33(3) PCT**)

6.9 The feature of **claim 18** is known from **D1**, Par 106. (**A 33(2) PCT**)

7. The application does not meet the requirements of **Article 6 PCT**, because:

7.1 **Claim 1** is giving **no designation** of the sensing system claimed. Even the possible applications of the sensing system are explained to have a wide range (p. 12-14 of the description), it appears to the examiner that not any sensing application is supported by the examples given. A designation which is commensurate with the description could be taken from p. 1, l. 3-4 as e.g. a system for sensing and interpreting dynamic loads. (**A 6 PCT**)

7.2 **Claim 8** appears to be redundant with claim 2 and should therefore be either removed or the features neural network and matrix manipulation technique should be made non-optional.

Nevertheless the term "matrix manipulation technique" appears to be vague and is not further supported by the description. Therefore, it renders the scope of protection of the respective claim unclear. (**A 6 PCT**)

7.3 The reference of **claim 11** to **any preceding claim** is unclear, because "**the housing**" as mentioned in the claim is introduced first in claim 10 as filed. (**A 6 PCT**)

7.4 There appears no support in the description of "flows **within** ... the surface" as claimed in **claim 11**. On the contrary, the description (p. 4, last paragraph) is disclosing that the deformable load bearing surface is made of rubber, plastics, metal or wood, which in normal cases do not allow a flow within the material. Otherwise, even a leak for the flowable material would be provided. (**A 6 PCT**)

7.5 The reference in **claim 11** by the wording "**the mechanism** of the deformation response of the surface" is unclear, because claim 1 is only disclosing "the deformation response of the surface to an applied load". (**A 6 PCT**)

Furthermore, the terminology of a feature shall be consistent throughout the application, especially in the claims (**Rule 10.2 PCT**).

7.6 The feature of **claim 11** that "the sensors are arranged to detect pressure differentials **due to the flow** of material" is a mix up of the physical cause and the corresponding effect. In agreement with general laws of physics, on p. 9, l. 20-22 of the description it is stated that the "compression causes the liquid within the enclosed space to flow by a diffusion process".

Furthermore, it appears to be **essential** from the description, e.g. p. 9, l. 22-24, that the sensors are arranged to detect pressure differences **in the liquid**. (**A 6 PCT**)

7.7 The reference of **claim 12** to claim 1 appears unclear, because "the housing", "the flow" and "the flowable material" are first mentioned in claim 11. (**A 6 PCT**)

7.8 The reference of **claim 17** only to steps (ii) and (iii) of claim 15 or 16 appears to be not clear, because this renders unclear which parts of the other steps are included in claim 17. For example, in steps (ii) and (iii) it is stated "**the sensory data**" and "**the load**" which are first mentioned in the designation and in step (i) of claim 15. (**A 6 PCT**)

8. According to the requirements of **Rule 5.1(a)(ii) PCT**, the relevant **background art** disclosed in the document **D1** and **D2** should be mentioned in the description.

9. Furthermore, a document reflecting the **prior art** described on page 1 is not identified in the description (**Rule 5.1(a)(ii) PCT**).

10. Independent claims are not in the **two-part form** in accordance with **Rule 6.3(b) PCT**, which in the present case would be appropriate, with those features known in combination from the prior art (documents D1 and D2) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

11. The features of the claims are not provided with **reference signs** placed in parentheses (**Rule 6.2(b) PCT**).

12. It appears to the examiner that **claim 11** could be **clarified** in the form:

The system as claimed in claim 10, wherein the housing contains a flowable material which flows under the surface in response to the deformation of the surface, and the sensors are arranged to detect pressure differentials in the flowable material.



This claim would still **not be new** in view of D1 and the arguments given above. (**A 33(2) PCT**)

Nevertheless, a subject-matter which is new and involves an inventive step could be formulated based on a clarified claim 11 by specifying the filling of the housing as disclosed in the description on p. 9, l. 1-4 by a **compressible porous medium** filled with an **incompressible fluid**.

13. With respect to the arguments given above, the applicant is invited to file amendments by way of replacement pages in the manner stipulated by **Rule 66.8(a) PCT**. At the same time, the applicant should bring the description into conformity with the claims as required by **Rule 5.1 (a) (iii) PCT**.